

What is claimed is:

1. An apparatus for processing a dough product, the dough product having an engagement surface and a leading feature, the apparatus comprising:

a support frame;

a conveyor operatively supported by the frame and having a movable surface upon which the engagement surface of the dough product can be carried in a process direction by a driving engagement between the moveable surface and the engagement surface of the dough product;

an impacting station comprising an impacting device operatively supported by the frame and movably disposed relative to the movable surface of the conveyor, the impacting device movable between an impact position wherein at least a portion of the impacting device is positioned to impact the leading feature of the dough product as it is conveyed to the impacting station and a position wherein the dough product can pass between it and the conveyor; and

an engagement enhancement means for enhancing a driving engagement between the moveable surface of the conveyor and the engagement surface of the dough product when the impacting device will impact the leading feature of the dough product.

2. The apparatus of claim 1, wherein the impacting device is pivotably connected to a support member of the frame and is further connected to a latching mechanism capable of holding the impacting device in a raised position.

3. The apparatus of claim 2, wherein the latching mechanism is connected to a trigger mechanism operatively supported in a position downstream in the process direction for releasing the latching mechanism and thereby allowing the impacting device to move to an unlatched position.

4. The apparatus of claim 3, wherein the trigger mechanism further includes a trigger device operatively mounted to the support frame and positioned so as to be hit by a rolled dough product for causing the trigger mechanism to release the

latching mechanism and thereby allowing the impacting device to move to an unlatched position.

5. The apparatus of claim 1, wherein the impacting device is pivotably connected to a support member of the frame and further includes an extendable cylinder connected to a support member of the frame, the extendable cylinder for controlled pivoting the of impacting device.

6. The apparatus of claim 1, wherein the impacting device comprises a board pivotably connected to a support member of the frame, the board having a plurality of grooves defining teeth for impacting the leading feature of the sheet of dough product.

7. The apparatus of claim 1, wherein the impacting device comprises a chain with at least one link having a projection that extends outward from the chain for impacting the leading feature of the sheet of dough product.

8. The apparatus of claim 1, wherein the means for enhancing driving engagement between the moveable surface and the dough product surface is a force of differential pressure obtained by creating a region of low pressure positioned below the movable surface, the region of low pressure extending at least across a portion of a width of the movable surface and extending a predetermined distance in the process direction.

9. The apparatus of claim 8, further comprising a vacuum chamber for creating the region of low pressure and wherein the moveable surface is perforated to permit enhancement of the driving engagement between the moveable surface and the engagement surface of the sheet of dough product.

10. The apparatus of claim 1, wherein the means for enhancing driving engagement between the moveable surface and the dough product surface is a force of differential pressure obtained by creating a region of high pressure positioned

above the movable surface, the region of high pressure extending at least across a portion of a width of the movable surface and extending a predetermined distance in the process direction.

11. The apparatus of claim 1, further comprising a rolling device operatively supported by the frame and having a rolling member disposed downstream in the process direction from the impacting station and relative to the movable surface of the conveyor for creating a drag force on a roll initiated portion of the dough product as it is driven by the movable surface for further rolling the dough product.

12. The apparatus of claim 11, wherein the rolling member comprises a chain mesh.

13. The apparatus of claim 11, wherein the rolling member comprises a sheet material.

14. The apparatus of claim 1, wherein the apparatus comprises a plurality of processing lanes wherein each lane includes an impacting station comprising an impacting device operatively supported by the frame and an engagement enhancement means for enhancing a driving engagement between the moveable surface of the conveyor and the engagement surface of the dough product when the impacting device will impact the leading feature of the dough product.

15. The apparatus of claim 14, wherein the means for enhancing driving engagement between the moveable surface and the dough product surface is a force of differential pressure obtained by creating a region of low pressure positioned below the movable surface, the region of low pressure extending across a width of the movable surface of plural processing lanes and extending a predetermined distance in the process direction.

16. The apparatus of claim 15, further comprising a vacuum chamber for creating the region of low pressure and wherein the moveable surface is perforated

to enhance driving engagement between the moveable surface and the engagement surface of the sheet of dough product.

17. An apparatus for processing a dough product, the dough product having an engagement surface and a leading feature, the apparatus comprising:

a support frame;

a conveyor operatively supported by the frame and having a movable surface upon which the engagement surface of the dough product can be carried in a process direction by a driving engagement between the moveable surface and the engagement surface of the dough product;

an impacting station comprising a chain having a plurality of links, at least one of the links having a projection extending outward therefrom, the chain being operatively supported by the frame and movably disposed relative to the movable surface of the conveyor so as to be movable between an impact position wherein at least a link of the chain with a projection is positioned to impact the leading feature of the dough product as it is conveyed to the chain and a position wherein the dough product can pass between it and the conveyor.

18. The apparatus of claim 17, further comprising an engagement enhancement means for enhancing a driving engagement between the moveable surface of the conveyor and the engagement surface of the dough product when the impacting device will impact the leading feature of the dough product.

19. An apparatus for rolling a sheet of dough product, the sheet of dough product having an engagement surface and a leading feature, the apparatus comprising:

a support frame;

a conveyor operatively supported by the frame and having a movable surface upon which the engagement surface of the dough product can be carried in a process direction by a driving engagement between the moveable surface and the engagement surface of the dough product;

an impacting station for initiating a roll of the sheet of dough product and comprising an impacting device operatively supported by the frame and movably

disposed relative to the movable surface of the conveyor, the impacting device movable between an impact position wherein at least a portion of the impacting device is positioned to impact the leading feature of the sheet of dough product as it is conveyed to the impacting station and a position wherein the sheet of dough product can pass between it and the conveyor; and

an engagement enhancement means for enhancing a driving engagement between the moveable surface of the conveyor and the engagement surface of the sheet of dough product when the impacting device will impact the leading feature of the sheet of dough product; and

a rolling member operatively supported by the frame and disposed downstream in the process direction from the impacting station and relative to the movable surface of the conveyor for creating a drag force on a roll initiated portion of the sheet of dough product as it is driven by the movable surface for further rolling the sheet of dough product.

20. The apparatus of claim 19, wherein the impacting device is pivotably connected to a support member of the frame and is further connected to a latching mechanism capable of holding the impacting device in a raised position.

21. The apparatus of claim 20, wherein the latching mechanism is connected to a trigger mechanism operatively supported in a position downstream in the process direction for releasing the latching mechanism and thereby allowing the impacting device to move to an unlatched position.

22. The apparatus of claim 21, wherein the trigger mechanism further includes a trigger device operatively mounted to the support frame and positioned so as to be hit by a rolled dough product for causing the trigger mechanism to release the latching mechanism and thereby allowing the impacting device to move to an unlatched position.

23. The apparatus of claim 19, wherein the impacting device is pivotably connected to a support member of the frame and further includes an extendable

cylinder connected to a support member of the frame, the extendable cylinder for controlled pivoting the of impacting device.

24. The apparatus of claim 19, wherein the impacting device comprises a board pivotably connected to a support member of the frame, the board having a plurality of grooves defining teeth for impacting the leading feature of the sheet of dough product.

25. The apparatus of claim 19, wherein the impacting device comprises a chain with at least one link having a projection that extends outward from the chain for impacting the leading feature of the sheet of dough product.

26. The apparatus of claim 19, wherein the means for enhancing driving engagement between the moveable surface and the dough product surface is a force of differential pressure obtained by creating a region of low pressure positioned below the movable surface, the region of low pressure extending at least across a portion of a width of the movable surface and extending a predetermined distance in the process direction.

27. The apparatus of claim 26, further comprising a vacuum chamber for creating the region of low pressure and wherein the moveable surface is perforated to permit enhancement of the driving engagement between the moveable surface and the engagement surface of the sheet of dough product.

28. The apparatus of claim 19, wherein the means for enhancing driving engagement between the moveable surface and the dough product surface is a force of differential pressure obtained by creating a region of high pressure positioned above the movable surface, the region of high pressure extending at least across a portion of a width of the movable surface and extending a predetermined distance in the process direction.

29. The apparatus of claim 19, wherein the rolling member comprises a chain mesh.

30. The apparatus of claim 19, wherein the rolling member comprises a sheet material.

31. The apparatus of claim 19, wherein the apparatus comprises a plurality of processing lanes wherein each lane includes an impacting station comprising an impacting device operatively supported by the frame and an engagement enhancement means for enhancing a driving engagement between the moveable surface of the conveyor and the engagement surface of the dough product when the impacting device will impact the leading feature of the dough product, and the means for enhancing driving engagement between the moveable surface and the dough product surface is a force of differential pressure obtained by creating a region of low pressure positioned below the movable surface, the region of low pressure extending across a width of the movable surface of plural processing lanes and extending a predetermined distance in the process direction, and further comprising a vacuum chamber for creating the region of low pressure and wherein the moveable surface is perforated to enhance driving engagement between the moveable surface and the engagement surface of the sheet of dough product.

32. A method for processing a dough product comprising the steps of:
providing a dough product, the dough product having an engagement surface and a leading feature;
positioning the engagement surface of the dough product onto a movable surface of a conveyor;
driving the dough product in a process direction by a driving engagement between the dough product engagement surface and the movable surface of the conveyor;
impacting the leading feature of the dough product with an impact device operatively positioned along the process direction by movement of the movable surface of the conveyor; and

enhancing the driving engagement between the engagement surface of the dough product and the movable surface when impacting the leading feature with the impact device.

33. The method of claim 32, wherein the impacting step further comprises moving the impacting device to a position permitting the dough product to move between the impacting device on the conveyor, and latching the impact device in a raised position.

34. The method of claim 33, further comprising the step of triggering release of the latching mechanism from the raised position of the impacting device by way of a trigger mechanism that is operatively supported in a position downstream in the process direction and thereby allowing the impacting device to move to an unlatched position.

35. The method of claim 34, wherein the step of triggering release of the latching mechanism comprises conveying the dough product downstream of the impacting device in the process direction and hitting a trigger device of the trigger mechanism.

36. The method of claim 32, wherein the impacting device is pivotably connected to a support member of the frame and further includes an extendable cylinder connected to a support member of the frame, the extendable cylinder for controlled pivoting the of impacting device.

37. The method of claim 32, wherein the impacting step comprises providing a board pivotably connected to a support member of the frame, the board having a plurality of grooves defining teeth for impacting the leading feature of the sheet of dough product.

38. The method of claim 32, wherein the impacting step comprises providing a chain with at least one link having a projection that extends outward from the chain for impacting the leading feature of the sheet of dough product.

39. The method of claim 32, wherein the step of enhancing the driving engagement comprises creating a force of differential pressure obtained by creating a region of low pressure positioned below the movable surface, the region of low pressure extending at least across a portion of a width of the movable surface and extending a predetermined distance in the process direction.

40. The method of claim 39, wherein a vacuum chamber is provided for creating the region of low pressure and wherein the moveable surface is perforated to permit enhancement of the driving engagement between the moveable surface and the engagement surface of the sheet of dough product.

41. The method of claim 32, wherein the step of enhancing the driving engagement comprises creating a force of differential pressure obtained by creating a region of high pressure positioned above the movable surface, the region of high pressure extending at least across a portion of a width of the movable surface and extending a predetermined distance in the process direction.

42. The method of claim 32, further comprising a step of rolling the dough product by a rolling device operatively provided downstream in the process direction from the impacting device that creates a drag force on a roll initiated portion of the dough product as it is driven by the movable surface.

43. The method of claim 32, further comprising processing of a plurality of dough products at the same time by an apparatus comprising a plurality of processing lanes wherein each lane includes an impacting station comprising an impacting device and an engagement enhancement means for enhancing a driving engagement between the moveable surface of the conveyor and the engagement surface of the dough product when the impacting device impacts the dough product.

44. A method for rolling a sheet of dough product comprising the steps of:

providing a sheet of dough product, the sheet of dough product having an engagement surface and a leading feature;

positioning the engagement surface of the sheet of dough product onto a movable surface of a conveyor;

driving the sheet of dough product in a process direction by a driving engagement between the engagement surface of the sheet of dough product and the movable surface of the conveyor;

impacting the leading feature of the dough product with an impact device operatively positioned along the process direction by movement of the movable surface of the conveyor, and thereby initiating a partial roll of the sheet of dough product;

enhancing the driving engagement between the engagement surface of the dough product and the movable surface when impacting the leading feature with the impact device; and

rolling the sheet of dough product after a roll is initiated by applying a drag force to the partial roll of the sheet of dough product while the sheet of dough product is driven in the process direction by the movable surface.

45. The method of claim 44, wherein the impacting step further comprises moving the impacting device to a position permitting the dough product to move between the impacting device on the conveyor, and latching the impact device in a raised position.

46. The method of claim 45, further comprising the step of triggering release of the latching mechanism from the raised position of the impacting device by way of a trigger mechanism that is operatively supported in a position downstream in the process direction and thereby allowing the impacting device to move to an unlatched position.

47. The method of claim 46, wherein the step of triggering release of the latching mechanism comprises conveying the dough product downstream of the impacting device in the process direction and hitting a trigger device of the trigger mechanism.

48. The method of claim 44, wherein the impacting device is pivotably connected to a support member of the frame and further includes an extendable cylinder connected to a support member of the frame, the extendable cylinder for controlled pivoting the of impacting device.

49. The method of claim 44, wherein the impacting step comprises providing a board pivotably connected to a support member of the frame, the board having a plurality of grooves defining teeth for impacting the leading feature of the sheet of dough product.

50. The method of claim 44, wherein the impacting step comprises providing a chain with at least one link having a projection that extends outward from the chain for impacting the leading feature of the sheet of dough product.

51. The method of claim 44, wherein the step of enhancing the driving engagement comprises creating a force of differential pressure obtained by creating a region of low pressure positioned below the movable surface, the region of low pressure extending at least across a portion of a width of the movable surface and extending a predetermined distance in the process direction.

52. The method of claim 51, wherein a vacuum chamber is provided for creating the region of low pressure and wherein the moveable surface is perforated to permit enhancement of the driving engagement between the moveable surface and the engagement surface of the sheet of dough product.

53. The method of claim 44, wherein the step of enhancing the driving engagement comprises creating a force of differential pressure obtained by creating a region of high pressure positioned above the movable surface, the region of high pressure extending at least across a portion of a width of the movable surface and extending a predetermined distance in the process direction.

54. The method of claim 44, further comprising processing of a plurality of dough products at the same time by an apparatus comprising a plurality of processing lanes wherein each lane includes an impacting station comprising an impacting device and an engagement enhancement means for enhancing a driving engagement between the moveable surface of the conveyor and the engagement surface of the dough product when the impacting device impacts the dough product.